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THE ADVANTAGES OF A CONSISTENT MILKING ROUTINE

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Consistent milking practices can improve herd performance, increase parlour efficiency and reduce mastitis incidence. Establishing a standard milking routine and training staff in the routine can frequently prevent the inconsistent milking practices that can drastically affect a cow's production and udder health.

Parlour efficiency is a popular topic, with different studies weighing in on the best procedures to follow for optimum yield and improved teat end condition. A recent University of Wisconsin study reinforced the need to closely monitor the milking procedures performed by staff.

The study surveyed 101 free-stall farms involved in a milk quality program between 2001 and 2003. Average herd size was 377 with an average of 6.4 people working in the parlour over the span of 1 month. Researchers found that 41% of the farms surveyed had a written milking procedure, 29% had never trained staff on a milking procedure, 49% had trained milkers only at hiring and 22% performed frequent training with their staff.

The study looked at the relationship of cows per hour per operator and mastitis incidence. As shown in Table 1, staff training and a written milking procedure were the two biggest influences on milking speeds and udder health.

The National Mastitis Council's (NMC) Recommended Milking Procedures include these steps as part of a complete routine:

1. Provide a clean, low-stress environment for cows.
2. Check foremilk and udder for mastitis.
3. Wash teats with an udder wash solution or predip teats in an effective product.
4. Dry teats completely with an individual towel.
5. Attach milking unit within 2 min of start of stimulation.
6. Adjust units as necessary for proper alignment.
7. Shut off vacuum before removing unit.
8. Dip teats immediately after unit removal with an effective product.

TABLE 1.
The Influence of Milking Routine on Performance for Wisconsin Freestall Farms (n=101)

Variable	Cows per hour per operator	Monthly rate of clinical mastitis (%)
Written milking routine		
Yes	46.9	5.0
No	35.6	7.1
Training frequency		
Never	33.6	9.6
At hiring	41.6	4.8
Frequently	49.4	5.8
Complete milking routine[1]		
Yes	40.8	5.5
No	35.3	10.3
Forestrip		
Yes	40.9	5.8
No	32.9	9.4

[1] Includes forestripping, predipping, drying before unit attachment.

Following these steps provides cows with a routine that encourages the release of oxytocin, a hormone that stimulates the udder's mammary cells, shedding milk into the cistern portion. Known as the milk let-down response, this allows most of the milk produced in the udder to be readily milked out.

If the cow becomes excited or stressed during this process, she also releases adrenaline, cancelling the oxytocin effect in the udder and preventing the milk let-down response. It can be minutes before the cow can calm down enough to release oxytocin again and initiate the milk letdown response. Washing and drying teats, and forestripping to check for abnormal milk effectively stimulate oxytocin release into the bloodstream.

Another reason to follow these recommended steps is to ensure adequate bacteria removal from the teats. Good teat sanitation practices will result in less bacteria unnecessarily ending up in your bulk tank and decreasing milk quality.

The most overlooked, and perhaps the dirtiest, part of the teat is the teat end. Train staff to focus a large part of their cleaning on the teat end to remove as much bacteria and debris as possible.

Staff must also ensure that they thoroughly dry teats, using one single-service paper towel or one dry cloth per cow, before attaching the milking unit. Damp or wet towels will contribute to the bacterial load on the teat skin. The moisture encourages bacteria growth and lessens the towel's absorbency.

The Wisconsin research looked at studies of herds where milkers properly dried teats before unit attachment. They showed a decrease of 44,000 somatic cells per millilitre in the bulk tank and a reduction of 25,000 bacteria colony-forming units at the teat end.

Step 5 in the NMC procedure is where you can make or break a cow's performance in the parlour. Following udder preparation and proper stimulation before unit attachment, also referred to as the prep lag time, puts more cows through the parlour and gives you better yields than if no preparation or stimulation were performed (see Table 2).

TABLE 2.
Optimum prep lag timing for cows in groups of three

	Time elapsed		
	Cow #1	Cow #2	Cow #3
Teat sanitation and forestrip	20 sec	40 sec	60 sec
Teat drying and unit attachment	80 sec	100 sec	120 sec

For example, for a group of three cows, start teat sanitation and forestrip on cow 1, which should take 20 sec. Then do the same to cow 2 and then cow 3. After forestripping cow 3, go back to cow 1 and thoroughly dry the teat before attaching the unit. This allows adequate contact time for the teat pre-dip or sanitizing solution on the teats to do its job effectively, which should be at least 30 sec. The time elapsed between starting teat sanitation and attaching the milking unit on each cow should be about 80 sec. This would be considered an acceptable prep lag time and provides milkers with that window of opportunity to exploit the oxytocin and milk let-down response in the cow to get better yields and faster milk-outs.

Most studies agree a 60–90-sec prep lag time is most effective to achieve faster parlour throughput and increased yield per cow. They also agree that grouping cows into threes or fours is key to using prep lag times to your advantage.

What happens if no prep lag time is observed or prep lag time is longer than 90 sec per cow? University of Wisconsin researchers analyzed milk flow in cows under three different prep lag times: 0 sec, 82 sec and 5.3 min.

The biggest effect of having no prep lag time, or 0 sec, was the appearance of a bimodal milk flow pattern. Milk flow increased at unit attachment and then suddenly decreased for up to a minute before increasing again. It took longer to reach peak milk flow, machine ontime was longer and yield was the lowest compared to the other two prep lag times at 12.05 kg. If milking units are attached to teats without adequate stimulation, occurrences of unit fall-offs and liner squawks from low milk flow rates also increase, especially on small teats. This further reduces parlour efficiency.

An 82-sec prep time let the cow reach peak milk flow within 1 min. She stayed at that peak for more than 2 min during milking. Yield was recorded at 15.64 kg. With a prep time of 5.3 min, peak milk flow was achieved within 1 min as well, but yield was only 12.40 kg.

Researchers concluded that prep lag times longer than the recommended 90 sec resulted in similar milk flow rates and peaks, but yield decreased with longer prep lag times, and parlour throughput was significantly slower. The longer the wait, the less effect oxytocin will have on the udder.

Not all cows have the same milk flow rate or require the same amount of stimulus to initiate the milk let-down response. This response depends on the cow's lactation stage and breed, and her milk yield. Higher-producing cows require less stimulation than low-producing cows, so the prep lag time may be significantly reduced for this group.

The biggest differences in higher-producing cows are a faster milk flow rate and a much higher peak milk flow. This results in a longer milking time. Poorer teat-end condition and a greater risk of new mastitis infections can result, due to stress exerted on the teat.

High-producing and early-lactation cows also tend to have leaky teats. The condition creates the perfect opportunity for mastitis-causing bacteria to invade the teat canal and udder. Milkers have to follow proper udder preparation procedures to reduce the risk of new mastitis infections occurring before, during and after milking.

Even though their teats appear plump with milk, these cows may still need some stimulus to initiate the milk let-down response. Forestripping and teat sanitation will help.

It's also a good idea to monitor your herd's production and group cows according to their milk flow rates and peak milk flow. This ensures prep lag times are consistent and adequate for each cow.

Adjusting automatic take-off settings (ATOs) for milking units helps reduce the risk of new mastitis infections, too. As well, it increases parlour throughput. One of the key principles here is to reduce overmilking. It increases a cow's risk to teat injury and could lead to a mastitis infection.

The milk flow rate on ATOs to get that last bit of milk is typically set at 0.2 kg/min. However, new studies have shown that increasing the milk flow rate threshold and decreasing the detachment time delay have remarkably improved teat-end condition.

A threshold of 0.4–0.7 kg/min and a reduced time delay (from 13 sec to less than 5 sec) decreased machine-on time by up to 1 min.

These studies showed no significant yield loss at these settings and a strip yield of about 25 mL, even with reduced milking time. Also, since the milking unit detached more quickly, overmilking was avoided and mastitis risk decreased due to less injury to the teat from overexposure to higher vacuum levels. Shortcuts in the parlour to save time can cost money with increased mastitis incidence.

The biggest challenge to improving mastitis incidence and parlour efficiency is motivation and the attitude of the people in charge of milking. Whether they're relief milkers or family members, proper written procedures, a complete milking routine and frequent training are essential.

Written standard operating procedures (SOP) must be in place and visible in the parlour for all milkers to follow. Frequent training helps keep procedures fresh in the milkers' minds at every milking.

Take time to ensure those responsible for milking are giving each cow proper teat sanitation, adequate stimulation and sufficient time for unit attachment and detachment. This will ensure the continued production of a quality product.

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